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Proceedings of the Pacific Regional Peer Review on the Characterization of Fishery Effects on Valued Species, Habitat and Ecosystem Components of the Proposed Scott Islands Marine National Wildlife Area

August 6-7, 2014
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Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

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SUMMARY

Canada's *Oceans Act* and Oceans Strategy commit Fisheries and Oceans Canada (DFO) to leading the development and implementation of a sustainable, precautionary and integrated ecosystem approach to oceans management. As part of this commitment, the Oceans Program is coordinating efforts within DFO and across other Federal and Provincial agencies to develop bioregional networks of Marine Protected Areas (MPAs) in the Pacific region, and to contribute to integrated ecosystem-based management approaches both regionally and nationally.

The first proposed marine National Wildlife Area (NWA), which will contribute to the Pacific MPA Network, is the Scott Islands marine National Wildlife Area (SImNWA). This area supports the highest concentration of breeding seabirds in Canada's Pacific Ocean. Although Environment Canada (EC) is the lead agency for the establishment of NWAs under the *Canada Wildlife Act*, DFO retains the regulatory authority for management of fisheries within NWAs. Therefore, in consultation with EC, DFO's Ecosystem Management (Oceans Program) and Fisheries Management branches have requested that Science Branch provide advice regarding the extent and nature of the risks from commercial fishing activities on marine bird species, their habitats, and the ecosystem functioning and community properties within the proposed SImNWA. The intended results of the analysis presented here are to: identify and inform issues that need to be addressed within an Integrated Management framework; and to prioritize gaps in knowledge and suggest potential research directions that can address these knowledge needs.

These Proceedings summarize the relevant discussions and key conclusions that resulted from a DFO, Canadian Science Advisory Secretariat (CSAS) Regional Peer Review (RPR) meeting on August 6-7, 2014, at the Pacific Biological Station in Nanaimo, B.C. A working paper (WP) focusing on the characterization of fishery effects within the proposed SImNWA was presented for peer review.

In-person and web-based participation included DFO Science, Ecosystem Management and Fisheries Management staff from regional and national offices, as well as staff from EC, the Province of British Columbia, and external participants from the commercial fishing industry, and environmental non-governmental organizations.

The conclusions and advice resulting from this review are summarized in a Science Advisory Report along with the findings of the Research Document, which will be made publicly available on the CSAS Science Advisory Schedule.

Compte rendu de l'examen régional par des pairs de la région du Pacifique par le sur la Caractérisation des effets des pêches sur les espèces valorisées, l'habitat et les composantes de l'écosystème de la réserve nationale marine de faune proposée aux îles Scott; les 6 et 7 août 2014

SOMMAIRE

La *Loi sur les océans* du Canada et la Stratégie sur les océans engagent Pêches et Océans Canada (MPO) à diriger l'élaboration et la mise en œuvre d'une approche durable de l'écosystème, de précaution et de gestion intégrée des océans. En vertu de cette obligation, le Programme des océans coordonne les efforts déployés au sein de Pêches et Océans Canada et d'autres organismes fédéraux et provinciaux en vue de mettre en place des réseaux biorégionaux d'aires de protection marines (AMP) dans la Région du Pacifique et de contribuer aux approches de gestion écosystémique intégrées aux échelles régionale et nationale.

La première réserve nationale de faune (RNF) en milieu marin proposée qui contribuera au réseau d'aires marines protégées du Pacifique est la Réserve nationale de faune en milieu marin des îles Scott. Cette zone abrite la plus forte densité d'oiseaux de mer nicheurs du Pacifique canadien. Bien qu'Environnement Canada (EC) soit l'organisme responsable de la création des réserves nationales de faune en vertu de la *Loi sur les espèces sauvages du Canada*, le MPO conserve l'autorité réglementaire pour la gestion des pêches au sein des réserves nationales de faune. Par conséquent, en consultation avec EC, la Direction de la gestion des écosystèmes (Programme des océans) et la Direction de la gestion des pêches du MPO ont demandé à la Direction des sciences de donner un avis sur l'ampleur et la nature des risques découlant des activités de pêche commerciale sur les oiseaux de mer, leur habitat, le fonctionnement de l'écosystème et les propriétés des communautés dans la réserve nationale marine de faune proposée aux îles Scott. Les résultats prévus de l'analyse présentés ici visent à déterminer et à préciser les problèmes à aborder dans le Cadre de gestion intégrée, à établir l'ordre de priorité des lacunes dans les connaissances et à suggérer des orientations de recherche possibles en vue de combler ces besoins en matière de connaissances.

Le présent compte rendu résume l'essentiel des discussions et des conclusions de la réunion d'examen régional par des pairs de Pêches et Océans Canada (MPO) et du Secrétariat canadien de consultation scientifique (SCCS) qui a eu lieu les 6 et 7 août 2014 à la Station biologique du Pacifique de Nanaimo, en C.-B. Un document de travail axé sur la caractérisation des effets de la pêche dans la réserve nationale marine de faune proposée aux îles Scott a été présenté aux fins d'examen par les pairs.

Au nombre des participants qui ont assisté à la réunion en personne ou par conférence Web, il y avait des employés des bureaux régionaux et nationaux du Secteur des sciences, de la Gestion des écosystèmes et de la Gestion des pêches du MPO, des représentants d'EC et de la province de la Colombie-Britannique ainsi que des participants externes de l'industrie de la pêche commerciale et d'organisations non gouvernementales de l'environnement.

Les conclusions et les avis découlant de cet examen sont résumés dans un avis scientifique, tout comme les conclusions du document de recherche qui seront rendues publiques dans le calendrier des avis scientifiques du SCCS.

INTRODUCTION

A Fisheries and Oceans Canada (DFO) Canadian Science Advisory Secretariat (CSAS), Regional Peer Review (RPR) meeting was held on August 6-7, 2014, at the Pacific Biological Station in Nanaimo, British Columbia, to identify and inform issues that need to be addressed within an Integrated Management framework in the proposed Scott Islands marine National Wildlife Area (SImNWA), to identify and prioritize gaps in knowledge, and to identify potential research or other actions to address these knowledge gaps. The resulting evaluation was structured using the Ecosystem Risk Assessment Framework (ERAF) developed to support DFO marine spatial planning in Pacific waters (DFO 2012). The following working paper (WP) was prepared and made available to participants prior to the meeting:

Boutillier, J. Characterization and Analysis of Fisheries related Risks to Valued Species, Habitats and Ecosystem/Community Properties within the proposed Scott Islands marine National Wildlife Area. DFO Can. Sci. Advis. Sec. WP 2014/15 OCN06.

The meeting Chair, John Holmes, opened the meeting by welcoming participants and reviewing general meeting logistics. The room was equipped with a speaker phone to allow remote participation by web-based attendees, and in-person attendees were reminded of the room's poor acoustics and to address comments and questions so they could be heard by those online. The Chair reviewed the role of CSAS in the provision of peer-reviewed advice, and gave a general overview of the CSAS process. The Chair discussed the role of participants, the purpose of the various products of an RPR (Science Advisory Reports, Proceedings and Research Documents), and the definition and process around achieving consensus. Everyone was invited to participate fully in the discussion and to contribute their knowledge to the process, with the goal of delivering scientifically defensible conclusions and advice, based on the best available current knowledge. A round of introductions followed.

The Chair reviewed the Terms of Reference (Appendix A) and the Agenda (Appendix B) for the meeting, highlighting the objectives and expected outcomes of this review. Twenty-eight people participated in the meeting in person or electronically (Appendix C). Mary Thiess was identified as the rapporteur. The Chair then noted that rather than following the standard approach of soliciting and circulating written reviews of the WP prior the meeting, he asked Rebecca Martone and Miriam O (experts in ecological risk assessment) to comment on the use of the ERAF framework in the WP during the meeting and participants with expertise in the Groundfish, Salmon, Shellfish, and Pelagic fishery sectors to provide feedback on data availability and bycatch monitoring within each sector.

PRESENTATION OF THE WORKING PAPER

The lead author, Jim Boutillier, presented an overview of the WP (see Appendix D for a summary).

POINTS OF CLARIFICATION

In the WP, the use of the term "fisheries" includes all *commercial* fisheries. The author noted that he did not intend or attempt to capture all fisheries in this analysis, although the methods presented here can be applied to other fisheries (e.g., First Nations food/social/ceremonial (FSC), recreational, etc.).

The author was asked whether the Lingcod Troll fishery is included in the hook and line or long-line category. He noted in response that the inconsistent use of terminology (e.g., hook and line is used synonymously with long-line) will be cleaned up in subsequent revisions.

An example of 14 Blackfooted Albatross caught in a local fishery in Alaska that were actually from Hawaii was noted as indicative of the need to consider the larger picture when conducting a comprehensive risk assessment. Some of the seabird species that utilize habitat in the SImNWA are highly migratory and so face risks elsewhere that need to be understood to place the risks in SImNWA within context for the species.

It was noted that birds were not an auditable species in the Groundfish Hook and Line monitoring program, until the last few years. There are attempts to try to estimate total mortality using counts from catch monitoring video data. The author indicated that this issue will be revisited in the Uncertainties Section of the working paper discussion.

It was noted that some jurisdictions have set limits on seabird bycatch. For example, incidental catches of Short-tailed Albatross in Alaska are limited to two birds in two years in the Pacific Halibut longline fishery, four birds in two years in the groundfish longline fishery, and two birds in five years in the trawl fishery. Once these limits are reached, a review of fishery practices is triggered.

With respect to calculations of bottom trawl impact, some trawls conducted between 2007-2011 were located outside the trawl footprint within SImNWA, and these trawls were not removed from the calculations of impact. The estimate presented (82.7% of the present allowable trawling areas has been impacted) could be a significant overestimate. The author noted that this issue would be discussed later in the review. The calculation was intended as a proof of concept (i.e., to demonstrate the type of calculation that can be made based on available data). It was not meant to imply that this is the recommended way (or the only way) to calculate this type of measure.

The WP author provided examples of the type of information that is not available (but would be necessary in order to conduct a comprehensive ERAF analysis). Information that is lacking for the habitat significant ecosystem components (SEC) examples (juvenile Rockfish/Pacific Sand Lance) includes:

- Identification of Rockfish species utilized as forage fish by seabirds;
- Bottom typing using multi-beam echosounder (MBES) data for the remaining 92% of SImNWA area that has not been surveyed;
- Quantification of the extent/nature of the physical contact of other fish gears and bottom trawl areas at <100m depth; and
- Identification/quantification/validation of additional areas of significance for Rockfish/Pacific Sand Lance.

For ecosystem SECs, the following information would be useful:

- an assessment of variations in anthropogenic stressors
- an assessment of the impact of changes in management actions.

A question about assessing the impact of noise or light pollution (e.g., from cruise ships passing through the SImNWA) was raised. The WP author responded that data and information about these stressors are limited and the Chair noted that the focus of the WP was restricted to stressors associated with fishing gear only rather than the broader suite of stressors associated with a comprehensive ERAF analysis, which would consider noise and light stressors and other vessel-related stressors. The WP author also reminded participants that this analysis was not intended to be an exhaustive study of all factors relevant to the SImNWA at this time.

It was noted that there are other potential sources of seabird bycatch data (e.g., longline surveys conducted for the International Pacific Halibut Commission) and research survey data from groundfish/salmon/shellfish cruises. Discussion followed on the effectiveness of the observer bycatch data, since most of these data are not identified to species for bird bycatch incidents. Participants questioned whether the tools and training provided to observers were sufficient to support such identification. It was suggested that the observer training program for the groundfish industry was a good model to follow, but it wasn't clear whether seabird identification training was available any more. This comment raised questions about other reasons for ongoing issues with data quality in the observer program. Possible issues include: insufficient time for proper bycatch identification, insufficient training for identification by observers, and a low priority for observers. It was also noted that it is difficult to identify birds in video audits of gear retrieval. It was suggested that new technologies should be investigated to address the identification issue (e.g., retaining the carcass or a small tissue sample for later genetic analysis and identification, which might be more reliable than visual identification). The logistics of implementing specimen (or tissue) collection and analysis of these samples remains to be worked out.

A number of other fisheries with possible bycatch data, or potential to collect bycatch data that were not mentioned in the paper but could be part of a comprehensive ERAF were identified: groundfish troll, Salmon troll, and recreational fisheries.

A question was raised about the current understanding of juvenile Rockfish habitat utilization in or near the SImNWA . A discussion followed about available data on this subject (mostly preliminary), which show that juvenile Rockfish are found in inshore/benthic/shallow areas of adult habitat, depending on the species); and subsequent interest in bottom trawl impacts on juvenile Rockfish habitat (as a secondary fishery impact). It was noted that juvenile Rockfish are not caught in the bottom trawl fishery and that juveniles are more likely to be found in habitats that are not trawled or surveyed .

Further discussion followed about which species of seabirds were feeding on juvenile Rockfish, and whether they were capturing Rockfish through predation or by scavenging. Diving birds tend to prey on juvenile Rockfish, but there was a discussion about the nutritional value of Rockfish (and fish in general), which depends on lipid content, to seabirds. Seabirds tend to be opportunistic and existing information on seabird diets is largely based upon food items brought to the chicks rather than diet items consumed by adult birds; the composition of the two diets is not necessarily the same.

REVIEW OF ECOSYSTEM RISK ASSESSMENT FRAMEWORK (ERAF) CONCEPTS AND IMPLEMENTATION

In lieu of the more traditional approach of presentation of formal working paper reviews, two ERAF experts were invited to provide an evaluation of the author's treatment of the ERAF concept with respect to the SImNWA. Participants were invited to provide feedback on the new approach.

FIRST REVIEW: REBECCA MARTONE

The first review was presented remotely by Rebecca Martone from the Centre for Ocean Solutions at Stanford University. Her review was based on the implementation of the ERAF, rather than the data used to inform it.

1. Purpose and Goals of the ERAF
    - To identify and prioritize anthropogenic risks to ecosystem components, and

- To inform the development of specific conservation objectives and management strategies to address these risks.

2. Key elements of the ERAF
   - Scoping →Level 1 qualitative risk → Level 2 semi-quantitative → Level 3 quantitative risk assessment.
   - The ERAF is set up like a hierarchy, but really a choice of methods/models.
   - This working paper did not use the full suite of tools, but rather focused on the Scoping methods and then the Level 3 Quantitative risk assessment, with elements of a Level 1 risk assessment to identify significant stressors for specific valued ecosystem components (SECs). The WP describes general knowledge requirements, gaps and approaches for conducting a Level 3 Risk Assessment to address risk to seabirds from fishing activities in the SImNWA.
   - Information needed to discern impacts: Species, Habitats, Community/Ecosystem properties.
3. Scoping Phase (Step 1): Identifying SECs
   - Species SEC selection guided by goals/objectives of the SImNW[illegible] (1A, 1B, 2C, 3D). These were compared to the ERAF screening criteria for Species (6 elements). These criteria were not used explicitly or comprehensively in the working paper but could easily be implemented—as illustrated in table on Slide 11.
   - Habitat SEC selection criteria (8 elements) are also available from the ERAF. These were not used in the working paper but could be, as illustrated in the table on Slide 13.
   - Community/ecosystems property SECs: ones chosen are interesting and require additional input, but again does not use the ERAF criteria explicitly (5 elements). Illustrative table on Slide 15 of the presentation.
   - SEC Selection Review:
     - Appropriate use of scoping section framework, but not comprehensive (e.g., included four seabirds, but 42 species have been identified in the SImNWA)
     - There are missing species SECs that meet goals/objective 1B. The analysis should consider risk of direct mortality to these species in the framework (e.g. juvenile rockfish, Pacific Sand Lance, Herring ,etc.).
     - If not, explanation/discussion as to why only looked at habitat SECs important to forage species but not to direct impacts to forage species is required.
     - Refer to the following for similar analysis and example result: An assessment of seabird-fishery interactions in the Atlantic Ocean, (Tuck et al. 2011: ICES J Mar Sci 68(8)).
   - Scoping Phase (Step 2):
     i. Identifying activities and associated stressors.
        - Some fisheries are missing from Table on page 11-12 of the WP, such as Tuna, Herring and Sardine (the table was not meant to be exhaustive).
        - Tuna will be added to the table in revisions; Sardine fishery was close to the SImNWA, but not in it, there is no Herring in the SImNWA. (Need to be clear why certain fisheries were chosen or not.)

ii. Evaluate potential impacts of anthropogenic activities in the SImNWA using Pathways of Effects (PoE) models

- Generic PoE outline and example of activity-based PoE.

- Identifying Activities Review:
  - Appropriate use of scoping section of framework.
  - Includes description of the fishing activities identified in the region and some of the stressors relevant to SECs.
  - Working paper should include the available fishing PoEs (mentioned on page 10, but not explicitly listed).

4. Level 1 Qualitative and Level 3 Quantitative Risk Assessments
   - Similar approach for both: Risk = Exposure x Consequence. Exposure and consequence of impacts depend on: species, habitats, ecosystems present; specific features of the seafloor habitats, including the natural disturbance regime; fishing gear configuration, the methods and timing of gear deployment and the frequency with which a site is impacted by specific gears; history of human activities, especially past fishing, in the area of concern.
   - Identify which fishing activities and stressors interact with which SECs in the SImNWA.
   - Identify the pathways by which different activities and stressors impact different SECs and their subcomponents, which can be useful for guiding mitigation strategies.
   - The working paper does not Identify the *most significant* stressors for each SEC by scoring the activities/stressors. This is okay, but should use Level 1 or 2 Risk Assessment to guide prioritization (See Tuck et al. 2011). Nor does the working paper Include multiple activities/stressors.
5. Level 3 Quantitative Risk Assessment
   - ERAF gives limited guidance. Quantitative assessments are used to provide advice to resource managers on the magnitude of the stressor (in the case of fisheries this is usually described as the portion of total mortality that is ascribed to fishing, also called fishing mortality) and how it relates to the species sustainability thresholds as a measure of population size.
   - Working paper Defines the steps to address Exposure and Consequence for each SEC type:
     - Define the unit of interest (population, habitat, etc.). Recommended data: species (genetics), habitats (habitat classification), community properties (need to consider how other stressors will shift habitats—e.g. climate change).
     - Provide function descriptions (e.g., spawning habitats for key forage species). Recommendations: link populations and habitats to function.
     - Quantify the exposure of the unit of interest to stressor (improved information is available for calculating exposure, particularly with community properties).
     - Quantify the effect from stressor of interest on the function (e.g., fishing mortality, changes to same) – need for improved metrics of exposure for some fisheries and whether current mitigation techniques reduce impacts.
     - Define reference points for risk to SECs (e.g. population status)

- Quantitative Risk Assessment Review:
  i. Species SECs:
    - Only included certain fisheries.
    - Provided a description of mortality associated with fisheries but not a clear description of how to link to reference points.
    - Reference point guidance not very clear
  ii. Habitat SECs:
    - Refers to ecologically and biologically significant areas (EBSAs) but didn't refer to EBSAs directly in habitat SEC selection—needs clarification.
    - Needs to provide better guidance about data needed, how to obtain how to model.

6. ERAF for SImNWA (summary slide)
   - Describes a subset of SECs based on goals and objectives of SImNWA (but see Tuck et al 2011: ICES J Mar Sci 68(8)).
   - Describes activities of interest and interactions with SECs.
   - Describes PoE models.
   - Identifies approaches to evaluate Exposure and Consequence in Level 3 framework to evaluate risk to seabirds from fishing.
   - Identifies knowledge gaps and potential quantitative modeling approaches.
   - Describes adaptable approach that allows integration of additional information as it becomes available.

SECOND REVIEW: MIRIAM O

The second presentation was by Miriam O (DFO). Her comments were structured around the objectives found in the TOR for the meeting.

TOR Objective1: Characterize and evaluate the nature and extent of the risks posed by commercial fishing activities, taking into account current management measures within the proposed SImNWA.

Step 1: SEC selection (criteria)

- Use tables to crosswalk rationale to ERAF, as presented in previous review.
- Use of EBSA criteria in SEC selection was confusing; liked use of trophic food web in community SEC selection.

Step 2: Extent and nature of activity stressor (interactions matrix)

- Use a table to summarize stressors for each SEC.

Step 3: Develop metrics that measure the risks (ERAF for ecosystem-based management (EBM) Risk Calculation)

- expand basic risk equation to include all sub-terms (exposure has 5 terms, 2 for intensity, 2 for consequence) to help identify gaps and uncertainties.
- Temporal and spatial aspects of exposure estimates not standardized.

TOR Objective 2: Identify information gaps and additional research necessary to evaluate the nature and extent of risks and consequences not possible in Objective 1.

- Information in text but would be helpful to provide this in a table in order for input to subsequent RA
- Sample shown: y-axis, risk terms; x-axis, impact/interaction[1-4]; will help to identify gaps and uncertainties.

TOR Objective 3: Discuss the strengths and challenges of ERAF application in this context.

- Characterization versus analysis.
- Relativity of assessment (i.e. scope of work): depending on goals of assessment, ERAF can be adjusted to suit; but can only be managed within the boundaries of the SImNWA relative rankings will have no basis outside the SImNWA.

GENERAL DISCUSSION OF THE REVIEWS

The sample table presented by Miriam O works well for habitat and for bycatch stressors. The desired end result though is to know the impact of fishing on seabirds and the data currently available are not sufficient to complete that assessment. This analysis is not a risk assessment per se.

Translating information about knowledge gaps into a table will help to highlight these deficiencies. The scope of this work is much larger than the boundaries of the SImNWA. For example, it is difficult to assess highly migratory species within a limited geographic area such as SImNWA. A table or formal scoring exercise is not necessarily helpful in this instance (not trying to do a Level 2 assessment) but a table such as that proposed will be helpful to illustrate the relevant elements, clarify language, and provide consistency and transparency.

It was recognized that the group needed to keep its discussion of the assessment in the working paper within scope of the TOR for the meeting, but it was also noted that better bycatch information (i.e., within the DFO catch monitoring framework), and higher quality information should be captured from managed fisheries (which applies beyond the SImNWA). It would be helpful for the working paper to briefly identify the driver/mandate behind the issues (e.g., catch monitoring framework, the *Migratory Bird Convention Act* (MBCA), the SARA, etc.), recognizing that a detailed examination of the regulatory/policy context is beyond the scope of a science paper. It was noted that the permitting requirements under SARA described in the working paper are a DFO approach to SARA listed species. The majority of seabird species in the SImNWA are not listed as Threatened. However, monitoring bycatch for SARA-listed species would result in the monitoring of all seabird bycatch. The bottom line is that there is a need for better resolution of species identification for seabirds (and all bycatch organisms) in fisheries managed by DFO.

FISHING STRESSOR/ACTIVITY INFORMATION REVIEW

GROUNDFISH

The methods used in the WP were considered appropriate for characterizing direct mortality. The methods to assess impacts on habitat were less clear, i.e., for areas of fishing activities that attract species that scavenge food from fishing vessels (the second of three habitat characteristics), because no PoE was provided. There is a habitat SEC overlap with various fisheries, but what is the overlap with birds? If there is no impact on habitat, then does that mean that no risk assessment is necessary? There is no detectable impact on the water

column, but there may be an impact at the ecosystem level or some other level. The habitat feature is a feeding aggregation, and fisheries can modify these aggregations.

It is also unknown at this time which species of juvenile Rockfish are SECs, so the impact on them cannot be assessed until species identity is known. A question about how to treat aquatic invasive species (AIS) was raised. It was decided that AIS were not a SEC, but rather they should be considered as a stressor in a comprehensive ERAF analysis.

Past studies have looked at telemetry data for some seabirds. These data show that some feeding spots are concurrent with trawl haul-back locations. The seabird species in the analysis should not be affected by haul-back because they are not species attracted to this type of food source. Further discussion occurred about the difference between areas of aggregation and areas attractive to birds (such as haul-back areas). The main question is the impact on these habitats from fishing. It was noted that detecting the impacts of fishing gear on pelagic habitats, if any, will be difficult.

With respect to the calculating the area impacted by bottom trawls within the SImNWA, tools exist that can remove the overlap areas between tows. (i.e., multiple tows on the same area really only counted once). The estimated area may be smaller than what is stated in the paper. The author will add a comment about future work that could be done to resolve this issue, but he noted that the calculation was done to show what would be needed to do it correctly. The area of impact is different from the intensity of impact (overlapping tows would be relevant to discussions of intensity). Revisit risk equation with sub-terms, intensity (area) is one of a number of terms. Additional terms include: intensity (amount) and Intensity (frequency).

The calculation of area impacted in the working paper summed seven years of impact for both longline and trawl fisheries. Should there be further thought on what time frame is relevant? The calculation as presented used the data that were available. Results could also be annualized rather than looking at the additive effects of seven years of fishing. It was noted that annualized area/intensity measures will show responses to management measures. The working paper calculation was only intended to show that this fishery has sufficient data (enough years, sufficient resolution) to allow these calculations to be made.

Participants noted that missing data may be due to transcription issues rather than observers lack of recording. Follow-up on this point could be included as a future work recommendation. It was re-emphasized that management specifies the auditable/testable bycatch species, and the list of species has changed over time. There is a need to go back and identify the drivers behind this work. These drivers will help to determine priorities and allocation of resources. The Marine Protected Areas Implementation Team (MPAIT - a multi-agency body, including EC and DFO, that coordinates the development of a bioregional MPA network in Pacific marine waters) can decide how this will work or not (and how to implement it). It was noted that there is industry support for bycatch sampling (i.e., genetics), the logistics just need to be worked out and set up.

A participant questioned the scale of mortality versus size of population with respect to seabird species in SImNWA that are part of broader pan-Pacific or global populations. This scaling issue is part of the scoring process (consequence). Science has a responsibility to estimate the risk to species within SImNWA and managers must prioritize those risks and evaluate measures to reduce or mitigate them within SImNWA.

A participant noted that there appeared to be two different discussions taking place: the ERAF and the data needed to inform it; and the question of how various policy tools and international agreements inform the level of priority that different agencies may place on the collection of seabird bycatch data. The regulatory and policy discussion is outside of the scope of the

working paper, which is primarily a science document. Various pieces of domestic legislation, including *SARA*, and the *MBCA*, international agreements and the associated policy and regulatory tools, may drive managerial responses to seabird bycatch issues. This CSAS review is the first time another agency's priority has been brought into the DFO peer-review process.

The WP has highlighted an issue with the data that draws in discussion about the policy/regulatory aspects. The policy/regulatory issues can be discussed briefly in the paper, but they were not a primary objective of the paper. However, the separation of policy and science in this context is not complete. The examples presented in the working paper were chosen because of the range of characteristics that they illustrate.

SALMON

The working paper included discussion on the salmon troll fishery operating in Area 12. Technically, the fishery takes place outside the SImNWA in Johnstone Strait, but seabirds (including individuals that nest in the SImNWA) forage in Area 12 where the fishery is located so there is the potential for impact(s) on seabird SECs. The working paper excluded salmon net fisheries because they are far removed from SImNWA, although some sea bird bycatch data are available from these fisheries.

Some additional salmon fishery data sources were noted. These include observer data from Coho fishery in area H (2002-onwards). Archipelago Marine would have these data and observer data from recent gillnet openings on sockeye in Area 11.

ALBACORE TUNA

The Canadian fleet is licenced to use hook-and-line gear, which includes longline and troll gears. However, the Canadian fishery uses troll gear exclusively to target juvenile Albacore Tuna in Canadian waters; longline gear is primarily used to catch adult fish, but adult Tunas do not migrate into Canadian waters. The Tuna troll fishery occurs in the SImNWA, mostly seaward of the shelf break. Vessel captains are required to report bycatch of all species in their logbooks, but this requirement is focused on other highly migratory species (Tunas and Billfishes), pelagic sharks and turtles in response to conservation and management measures enacted by the Inter-American Tropical Tuna Commission (IATTC), of which Canada is a member. The Canadian troll fishery uses jigs and are not permitted to use bait, and so are not likely to catch seabirds. Although no vessels use longline gear, there are regulations in place requiring the use of mitigation measures to reduce seabird bycatch (tori lines, setting just before dawn, etc.) and observers on vessels greater than 24 m in length, in accordance with international obligations as a member of the IATTC.

Participants questioned the potential impacts of the recreational tuna fishery, where live bait might be used, depending on fisher preference. It is very different from commercial fishery operation (and there are currently no regulations other than daily limits and possession limits). It was noted that there is anecdotal evidence of a growing recreational fishery, particularly off southwest Vancouver Island, and it was clarified that this fishery uses jigs and lures rather than live bait. At present, recreational fishermen are not required to report seabird bycatch. DFO Science and Fisheries Management (FM) are gathering catch and effort information from this fishery in 2014 with the cooperation of the major marinas, lodges and fishing tournament organizers because Canada has international obligations to report all catches of highly migratory species by gear type. It was noted that some vessels in the US commercial albacore fleet that are able to access Canadian waters through the Canada/United States Pacific Albacore Tuna Treaty use bait in US waters, but are not permitted to use live bait when they are in Canadian waters.

INVERTEBRATES/OTHER

No discussion occurred because there was no one knowledgeable on practices in this fishery sector at the meeting.

GENERAL DISCUSSION

ISSUES

- One of the most fundamental issues is the missing/inconsistent/incomplete bycatch information collected across fisheries managed by DFO. At a minimum, date, position (latitude and longitude) and identification of bycatch to species is required from all fisheries in order to conduct a complete ERAF.
- Participants questioned whether there are options for "allowable harm" assessments on seabirds (similar to those that DFO conducts for aquatic species listed as Endangered or Threatened) under the *SARA* or from EC. EC does not issue permits for seabird catch under the *SARA* and noted that no seabird bycatch is allowed under the *MBCA*. In practice, as long as the fisheries demonstrate due diligence through the implementation of mitigation measures and other policy tools to reduce risk, then that is considered compliance by EC. Thus, there is an emphasis on the need to develop and implement programs so fishers can do their due diligence.
- Participants discussed relative risks, i.e., events taking place in Canadian waters cannot be looked at in isolation of what is happening elsewhere in a species' range. What are the cumulative impacts across their entire range and life cycle? If the data exist and were available, then risks across all stressors could be assessed using the ERAF approach and risks could be prioritize based on results.
    - First, what is the relative impact of bycatch in SImNWA on the species concerned? In general, this information does not exist at present and this point needs to be stressed in the paper.
    - Secondly, can the risk of bycatch in or near SimNWa be ranked on an international scale? Not at this time, but there is growing international effort to address this type of assessment (so it is coming). Actually, it is more like an assessment of the scale of impact rather than risk, per se. Whatever the outcome of this kind of assessment, Canada will still need to comply with all regulatory frameworks.
- Participants questioned whether there was a standardized definition of bycatch. An accepted definition of bycatch includes catch of any **non-target** species (e.g., turtles, sharks, mammals, seabirds, fish, invertebrates).
- It is obvious that data quantity is an issue in some fisheries, but also there is a data quality issue in other areas (e.g., gaps were found in the Fisheries Operating System (FOS) database). Basic information is missing for key fields, so data quality control measures are not being implemented. There is also a need to be able to assess seabird bycatch against effort (if there isn't 100% bycatch monitoring coverage). The tools exist—but they are not being used to their full potential at present. Furthermore, high uncertainty can lead to a high risk rating in the ERAF.
- Subsequently, if the stated objectives cannot be met, it becomes important to track why not so that adjustments can be made (i.e., change the objectives, change the process so that objectives can be met, or both).

- The author reiterated that this is not an ERAF, but more of a scoping exercise for how it could be implemented if the necessary data existed. The data are not only needed for the ERAF, but also to assess or evaluate any mitigation measures that are implemented. Luckily, mitigation efforts generally work across all species (so it will be to the benefit of all, not just those identified as being at risk/threatened).
- Participants discussed how to capture uncertainty in bird species identification. Having sufficient data to conduct a comprehensive ERAF analysis is one thing, but there are other data needs as well. For example, factors such as population size, life history traits, and estimates of relative mortality from sources other than fisheries need to be understood prior to conducting a comprehensive ERAF analysis. Some seabirds are present all year in the SImNWA, though numbers are lower in the fall–winter period, but most breeding birds likely migrate elsewhere after breeding. It will be important to identify the additional risks faced by those migratory seabirds outside of the SImNWA when conducting a comprehensive ERAF analysis and some new data are available documenting the migration of some breeding seabirds in fall–winter. However, it was noted that the strongest driver of sea bird population declines in general is bycatch in fisheries. The Regulatory Strategy for the SImNWA, which is based on extensive public consultations, indicates that fisheries will continue in the NWA and that they will continue to be managed by DFO. Thus, there is an ongoing need for industry, DFO and EC to continue co-operative efforts to reduce seabird bycatch where needed.
- An additional stressor not identified in the working paper was discussed (declining prey fish abundance). This issue is particularly important when looking at ecosystem SECs. Birds have an energetic requirement to eat high-lipid fish. It is unknown how they will respond to declines in forage fish, for example, prey switching might occur. There is a need for better coordination and communication among programs, perhaps in the form of State of the Ocean-type meetings and a need for food web trophodynamic-type surveys and studies. More cooperation, collaboration and integration across programs, departments and agencies is required to address these multifaceted issues (e.g., consider aligning bird studies with fish studies).
    - As an example, it is possible to get water column backscatter data from CHS MBES bottom surveys (these have huge data requirements—in the order of multi-terabytes), along with groundfish diet analyses (although these are of limited utility due to issues of net feeding, and regurgitation during haul-back). As always, additional work is constrained by the limitations of human and financial resources.
    - A similar study has been commissioned from an oceanographic perspective. At some point, both processes need to be brought together. This conjoining would allow identification of issues relevant to specific agencies (EC, DFO, etc.).
- The group then reviewed each of the Research Recommendations provide in Section 6.2 of the working paper to ensure participants were supportive of them. Revisions and additions are noted in the Recommended Revisions section following. The Chair will provide a revised copy of the list of Research Recommendations to the author following the meeting.

CONCLUSIONS AND RECOMMENDATIONS

The working paper was accepted with revisions. The Chair presented a draft SAR that was edited collectively by the participants to achieve consensus on the key findings,

recommendations and conclusions of this peer review. The chair retained the revised draft SAR and will send a completed draft out to participants for comment within two weeks.

RECOMMENDED REVISIONS TO THE WORKING PAPER

- Need to establish consistent terminology throughout WP for ERAF concepts, fishing gear types, etc.
- Elements of ERAF used in WP not clearly identified. Scoping, Level 1 and Level 3 RAs. Highlight crosswalk between SEC selection criteria used in SIMNWA and ERAF. Grab tables produced by Rebecca. Might also be some headings in the WP.
- Add emphasis that WP did not intend to provide exhaustive review of all SECs or all sources of data in the SImNWA (as example, vessel impacts—which are considered separately from gear impacts—were not included in this study)
- Forage species SECs – did not look at direct mortality, but habitat changes are indirect assessment. Need to justify this in revision. Identify fisheries with opportunities to fish within SIMNWA and those with no opportunities. (Tuna will be added to Table 1 in revisions; sardine fishery was close to the SImNWA, but not in it, herring not in it (need to be clear why certain ones were chosen or not)
- PoE model flow diagram in paper? Should include the available fishing PoEs (mentioned by not explicitly listed on p. 10 of WP)
- TOR Objective 1: Clarify EBSA criteria used in SEC selection. Might be as simple as not referring to EBSA.
- TOR Objective 1: Consider adding an interaction matrix – table of stressors by SEC with check marks for those cells in which interactions occur. Consider identifying the most significant stressors for each SEC *by scoring the activities/stressors, see* ICES J Mar Sci (2011) 68(8) Tuck et al as an example.
- Level 3 RA:
    - Species SECs:
        i. only certain fisheries
        ii. description of mortality associated with fish but not clear how to link to reference points
        iii. reference point guidance is not very clear:
    - Habitat SECs
        i. refer to EBSAs but didn't refer to ESAs directly in habitat SEC selection—needs clarification
        ii. better guidance here about data needed, how to obtain how to model
- TOR Objective 1: Develop metrics that measure the risks: Expand Risk equation to include sub-terms of exposure and consequence to help identify gaps and uncertainties. Will fill in some of the blanks in the text.
- Temporal and spatial aspects of exposure estimates not standardized
- TOR Objective 2: information in text, but might be helpful to provide in a table as well
- TOR Objective 3: consider emphasizing characterization versus analysis, what WP is versus what it is not intended to do; emphasize the relativity of the assessment (pertains

only to what occurs within the boundaries of the SImNWA, no basis outside this area) → add a disclaimer statement?

- Improved clarity and consistency in wording around what level of risk assessment is being undertaken.
- There seems to be a disconnect in Section 5.3: the risk equation (Equation 1: Risk = Exposure x Consequence) applies to Levels 1 and 2 of the ERAF, but not necessarily to Level 3. The Methods given for quantifying risk directly below this in Section 5.3.1 are Level 3 methods, which do not use this risk equation. This seems confusing because the use of Equation 1 implies that a Level 1 or 2 was to be used, but the methods imply Level 3. This disconnect that should be addressed in revisions.
- Analysis of trawl footprint – need to note in revised paper that overlaps not removed in this paper, but should be in quantitative assessment. Author to talk to Norm Olsen who has a tool that can be used for this purpose.
- Fishing footprint data summarized over several years – might be more appropriate to provide annual summary as would show change in area and effort and would be easier to assess against management measures put in place. Perhaps make this a recommendation in WP for quantitative assessment. Clarify that info presented was just an illustration and add caveat that further temporal/spatial/effort standardization would be beneficial.
- SAFE method (p16) – data poor stock assessment method. Clarify this is not a stock assessment method and is only recommended in cases where traditional stock assessment methods can't be used.
- Recommendations 7 and 8 – should mention specific fisheries (species x gear), e.g., salmon troll, groundfish gillnet, etc.
- Consider adding a section on regulatory drivers and EC's priorities to provide some context for the WP. The WP has highlighted an issue with the data that has drawn in the policy/regulatory discussion. This discussion can be summarized in the paper, but it should be noted that focus of the WP is on the science rather than the policy/regulatory framework.
- Emphasize why this was chosen even though it is outside SImNWA → due to the effects on highly migratory birds (Section 5.2.2.3)
- Research Recommendations need to be reorganized. Currently have recommendations for Species, Habitats, Ecosystem/Community Properties. Need to add a fourth category called "Other Considerations" for items that aren't relevant to an ERAF specifically. Each discussion item then needs to identify what it deals with in ERAF terms (e.g., consequence, resiliency; or exposure, area overlap, etc.), Current Context (mostly renaming ACTION in the original), and Recommendation for next steps. Expand on preamble in each subsection (particularly Species and Habitat) to note the source of the recommendations and jurisdiction (DFO, EC, other). Not intended to assign responsibility, but to identify potential for cross-collaboration, etc. Preamble for Ecosystem/Community Properties could be used as a template for the other 2 sub-sections.
- Many citations in the text are not listed in the Literature Cited Section. Also, the format of citations in the text and especially in the Literature Cited Section is inconsistent.

APPENDIX A. TERMS OF REFERENCE

Characterization of Fishery Effects on Valued Species, Habitat and Ecosystem Components of the Proposed Scott Islands marine National Wildlife Area

Regional Peer Review Meeting - Pacific Region

August 6-7, 2014
Nanaimo, BC

Chairperson: John Holmes

Context

Canada's *Oceans Act* and Oceans Strategy commit Fisheries and Oceans Canada (DFO) to leading the development and implementation of a sustainable, precautionary and integrated ecosystem approach to oceans management. As part of this commitment, the Oceans Program is coordinating efforts within DFO and across other Federal and Provincial agencies to develop bioregional networks of Marine Protected Areas (MPAs) in the Pacific region, and contribute to integrated ecosystem based management approaches both regionally and nationally. This effort in the Pacific Region is being coordinated through a joint Federal/Provincial team called the Marine Protected Area Implementation Team (MPAIT).

The first marine National Wildlife Area being proposed which will contribute to the Network is the Scott Islands marine National Wildlife Area (NWA)).

In Budget 2007 and Budget 2013 Government committed to developing a proposal to create the Scott Islands NWA. National Wildlife Areas are established under the *Canada Wildlife Act*. The Scott Islands NWA is being established to protect the marine habitat of the largest and most diverse seabird colony in Pacific Canada, in the context of a marine ecosystem-based management approach. The vision and goals for this area are consistent with the *Canada Wildlife Act* and take into account the broader regional context within which the proposed marine NWA is situated. The vision is for a marine National Wildlife Area around the Scott Islands that conserves seabird populations as a vital part of a healthy marine ecosystem that also sustains the socio-economic and cultural values of present and future generations.

Current activities will be managed, and new activities assessed, to mitigate detrimental effects on the marine environment and in keeping with the conservation objectives for the NWA. Protecting high-quality functioning habitat now is far less expensive than restoring degraded habitats in the future. The NWA will bring an enhanced focus to research, monitoring, surveillance and enforcement in order to meet the conservation objectives for the seabirds and the highly productive marine environment.

Environment Canada is the lead Federal Department for the establishment of NWAs. The proposed Vision and Goals for the Scott Islands NWA identified in the Regulatory Strategy for the Designation of the Proposed Scott Islands Marine National Wildlife Area (Environment Canada, 2013) are:

Vision: A marine National Wildlife Area around the Scott Islands that conserves seabird populations as a vital part of a healthy marine ecosystem that also sustains the socio-economic and cultural values of present and future generations.

Goal 1: The natural habitats, ecosystem linkages and marine resources that support seabird populations nesting on the Scott Islands are protected and conserved.

Goal 2: The risk of adverse effects on the breeding productivity and survival of seabirds resulting from human activities is mitigated in keeping with the conservation and protection objectives.

Goal 3: The marine NWA is managed in a manner that recognizes the authorities for management of human activities in the marine environment and takes into account the socio-economic and cultural values sustained by the marine ecosystem.

Goal 4: Understanding of the marine ecosystem and socio-economic and cultural values informs management of the marine National Wildlife Area.

There are over forty species of marine birds that utilize the area for breeding and/or feeding, including five species that are presently listed by the *Species at Risk Act* (SARA) under Schedule 1 as Threatened (e.g. Marbled Murrelet, Short-tailed Albatross, Pink-footed Shearwater) or of Special Concern (e.g. Ancient Murrelet, Black-footed Albatross). Commercial fishing occurs in the NWA area. This activity can have a variety of impacts on marine birds, their natural habitats, and the ecosystem linkages and marine resources that support them.

Departmental mandates of Fisheries and Oceans Canada (DFO) speak to Canada's commitments to manage anthropogenic impacts, including fishing, in a manner that insures sustainable utilization, conservation of biodiversity, no net loss of fisheries habitat and protection of species at risk. The legal precedence for this mandate is derived at the national level under the *Fisheries Act* and the SARA, and under ratified international agreements such as the Convention on Biological Diversity (CBD), and the United Nations General Assembly (UNGA) Resolution 61/105. These regulations and international agreements provide the characteristics and definitions of what is legally "important".

In 2013, DFO released a national Policy on Managing Bycatch and Implementation Guidelines for the Policy. It applies to all non-retained catch, including birds that become entangled in fishing gear, in commercial, recreational and Aboriginal fisheries managed under the *Fisheries Act*. As with other policies under the Sustainable Fisheries Framework, the implementation of the Policy on Managing Bycatch will be phased in over time through existing Integrated Fisheries Management Planning processes.

Since 2008, DFO and EC have worked together in a Seabird Bycatch Working Group to share data on seabird bycatch within numerous fisheries, review and analyze bycatch data, and explore options for mitigating seabird bycatch. The work recognizes EC's responsibilities for seabirds and the tools DFO has to mitigate the impacts of fisheries on seabirds and has resulted in the provision of available data on seabird bycatch to EC. Seabird bycatch mitigation measures have also been introduced in license conditions for groundfish fisheries. Prohibitions are in place against killing, harming, harassing, capturing or taking any marine birds listed as Threatened, Endangered or Extirpated under SARA, unless authorized or permitted under section 73 or 74 of SARA.

An evaluation on the nature and extent of risks from commercial fishing activities, on a selection of representative marine bird species that occur within the proposed Scott Islands marine National Wildlife Area, has been undertaken through a collaborative EC/DFO project. This risk assessment has been informed by two DFO Canadian Science Advisory Secretariat, Regional Peer Review processes; (1) Risk-based Assessment Framework to Identify Priorities for Ecosystem-based Oceans Management in the Pacific Region (DFO 2012) and (2) The extent and nature of exposure to fishery induced remobilized sediment on the Hecate Strait and Queen Charlotte Sound glass sponge reef (Boutillier et al. 2013) .

While EC is the lead for the establishment of NWAs, DFO retains the regulatory authority for management of fisheries within NWAs. Therefore, in consultation with EC, DFO's Ecosystem

Management Branch (Oceans Program) and Fisheries Management have requested that Science Branch provide advice regarding the extent and nature of risks from commercial fishing activities on marine bird species, their habitats, and the ecosystem functioning and community properties within the proposed Scott Islands Marine National Wildlife Area.

Departmental mandates of Fisheries and Oceans Canada (DFO) speak to Canada's commitments to manage anthropogenic impacts, including fishing, in a manner that insures sustainable utilization, conservation of biodiversity, no net loss of fisheries habitat and protection of species at risk. The legal precedence for this mandate is derived at the national level under the *Fisheries Act* and the *Species at Risk Act* (SARA), and under ratified international agreements such as the Convention on Biological Diversity (CBD) and the United Nations General Assembly (UNGA) Resolution 61/105. These regulations and international agreements provide the characteristics and definitions of what is legally "important".

The information and advice resulting from this request will be used to inform the development of an integrated ecosystem management plan for the Scott Islands NWA, identify information gaps and research needs in the understanding of fisheries/marine bird interactions in the NWA geographic area, and contribute more broadly to the development of the Northern Shelf Bioregion MPA Network in the Pacific region.

Objectives

The following working paper will provide the basis for discussion and advice respecting the objectives outlined below:

Authors: J. A. Boutillier. Characterization and Analysis of Fisheries related Risks to Valued Species, Habitats and Ecosystem/Community Properties within the proposed Scott Islands marine National Wildlife Area CSAP Working Paper 2014-15/OCN06

1. Characterize and evaluate the nature and extent of the risks posed by commercial fishing activities, taking into account current management measures within the proposed Scott Islands marine National Wildlife Area, to;
   a) Marine bird species (a sub-set of the species will be examined);
   b) Habitats used by marine birds and their prey species; and,
   c) Ecosystem, functioning and community properties.
2. Identify information gaps and additional research necessary to evaluate the nature and extent of risks and consequences not possible in (1).
3. Discuss the strengths and challenges of ERAF application in this context.

Expected publications

- CSAS Science Advisory Report (1)
- CSAS Research Document (1)
- CSAS Proceedings

Participation

- DFO Science,
- DFO Ecosystem Management Branch (Fisheries Protection, Species at Risk, Oceans Program)
- DFO Fisheries Management
- Environment Canada
- Natural Resources Canada

- Province of BC
- Parks Canada
- First Nations
- Academia
- Environmental Non-government Organizations
- Fishing Industry

Additional Information

Environment Canada. 2013. Regulatory Strategy for the Designation of the Proposed Scott Islands Marine National Wildlife Area. (Accessed 05 February 2015)

DFO. 2012. Risk-based Assessment Framework to Identify Priorities for Ecosystem-based Oceans Management in the Pacific Region. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/044.

Boutillier, J., Masson, D., Fain, I., Conway, K., Lintern, G, O, M., Davies, S., Mahaux, P., Olsen, N., Nguyen, H. and Rutherford, K. 2013. The extent and nature of exposure to fishery induced remobilized sediment on the Hecate Strait and Queen Charlotte Sound glass sponge reef. DFO Can. Sci. Advis. Sec. Res. Doc. 2013/075. viii + 76 p.

APPENDIX B. AGENDA

Agenda		
Wednesday August 6 – Day 1		
09:00	Welcome and Introductions	John Holmes
09:05	Review Agenda and Housekeeping Items	John Holmes
09:10	CSAS Overview and Meeting Procedures	John Holmes
09:20	Terms of Reference	John Holmes
09:30	Presentation of the Working Paper	Jim Boutillier
10:30	***Break***	
10:45	ERAF Concepts and Implementation in SIMNWA	Rebecca Martone, Miriam O
	Discussion 1. Is the ERAF a useful approach to characterizing issues and identifying knowledge gaps for integrated management in SIMNWA? 2. Are the SECs (species, habitats, ecosystem/community properties) representative of SIMNWA? 3. What are information needs of a WP supporting an ERAF application? 4. Is the operational guidance concerning the implementation of the ERAF in SIMNWA appropriate?	All Participants
12:00	***Lunch***	
13:00	Methodology Discussion Continued	All Participants
14:30	***Break***	
14:45	1. Fishing Stressor/Activity Information Review i. Groundfish ii. Invertebrates iii. Salmon iv. Albacore Tuna	Participating Experts
16:30	***Adjournment***	
Thursday August 7 – Day 2		
09:00	Introductions and Housekeeping	John Holmes
09:10	Review Day 1 and Agenda for Day 2	John Holmes
09:30	Continue discussion from Day 1 (if necessary) Issues • Data collection in an ecosystem context • Species/population level identification • Identifying biological functions of VECs/SECs	All Participants

Agenda		
	(species, habitat, ecosystem/community properties), e.g., food web studies • Research Recommendations – Check for comfort • WP proposes ERAF application to assess activity-specific risk in a particular locale. Uncertainties/risks to this approach. • WP provides a blueprint on information needs for conducting a L3 risk assessment. Is the guidance sufficient?	
10:30	***Break***	
10:45	Continue and wrap-up discussion	All Participants
12:00	***Lunch***	
13:00	Science Advisory Report - Develop Consensus on: • Key results, conclusions and recommendations • Uncertainties • Science Advice • Other Issues	All Participants
14:30	***Break***	
14:45	Science Advisory Report Discussion Continued	All Participants
16:15	Wrap-up, next steps, other business	All Participants
16:30	***Adjournment***	

APPENDIX C. PARTICIPANTS

Last Name	First Name	Affiliation
DFO Pacific		
Binning	Kelly	FM, Resource Management
Boutillier	Jim	Science, Emeritus
Eros	Carole	FM, PICFI
Fu	Caihong	Science, MEAD
Hargreaves	Marilyn	Science CSAP
Holmes	John	Science, MEAD
Holt	Kendra	Science, MEAD
Hillier	Joy	Oceans, South Coast
Ibey	Hilary	EMB, Oceans Program
Keizer	Adam	FM, Resource Management
Ladell	Kate	EMB, Oceans Program
Leslie	Karen	SARA
MacDougall	Lesley	Science CSAP
O	Miriam	Science, OSD
Oldford	Greig	EMB, Oceans Program
Pinnell	Nadine	FM, Resource Management
Thiess	Mary	Science, SAFE
Workman	Greg	Science, MEAD
DFO NHQ		
Sheppard	Victoria	Ecosystems Programs Policy
Environment Canada		
Albert	Courtney	Environment Canada, CWS
Connolly	Michelle	Environment Canada, CWS
Jones	Greg	Environment Canada, CWS
Morgan	Ken	Environment Canada, CWS
External Participation		
Chalmers	Dennis	Province of BC
Curry	Gordon	Living Oceans Society
Martone	Rebecca	Center for Ocean Solutions, Stanford University
Turris	Bruce	Fishing Industry
Wallace	Scott	David Suzuki Foundation

APPENDIX D. SUMMARY OF THE WORKING PAPER

Boutillier, J. Characterization and Analysis of Fisheries related Risks to Valued Species, Habitats and Ecosystem/Community Properties within the proposed Scott Islands marine National Wildlife Area. DFO Can. Sci. Advis. Sec. WP 2014/15 OCN06.

This paper is a result of a joint request for Science Advice by Environment Canada (EC), Fisheries and Oceans (DFO) Ecosystem Management Branch and DFO Fisheries Management. The request was for advice regarding the extent and nature of risks from commercial fishing activities on marine bird species, their habitats, and the ecosystem functioning and community properties within the proposed Scott Islands marine National Wildlife Area (SImNWA). This evaluation has been conducted using the best information available and is being applied against the Vision and conservation goals and objectives of key species, habitats and ecosystem/community properties proposed for EC's SImNWA. The intended results of this analysis are to: identify and inform issues that need to be addressed within an Integrated Management framework; prioritize gaps in knowledge and suggest potential research directions that will address these knowledge needs.

The focus of this present characterization of risks is to provide examples of the nature and extent of the interaction between commercial fishing stressors and the identified SImNWA species, habitat and ecosystem/community Valued Ecosystem Components (SECs) to identify and inform issues that need to be addressed within an Integrated Management framework. It is not intended to be an exhaustive review of all possible SECs, or a comprehensive Ecosystem Risk Assessment Framework (ERAF) analysis. Four species SECs, three habitat SECs and one ecosystem/community property SEC were identified and reviewed in this context.

The next step is to identify the pathways of effect (PoEs) that link the activities (commercial fisheries) to SECs. The paper considered PoEs that result in direct mortality of SEC species and those that affect SEC populations indirectly by modifying benthic habitats and ecosystem/community properties. These pathways were then cross-referenced to nine types of fishing activities that take place in the SImNWA (again, not an exhaustive review of all fisheries present).

Finally, metrics were discussed to assess the risk that each activity poses to the sample of SECs previously identified. The paper concludes with a discussion of the data gaps and research needs for each component within the ERAF.